

What is claimed is:

1. A fuel cell stack comprising a fuel cell unit composed of a solid polymer ion exchange membrane interposed between an anode electrode and a cathode electrode, and separators for supporting said fuel cell unit interposed therebetween, said fuel cell units and said separators being stacked in a horizontal direction, said fuel cell stack including:

10 a communication hole which is provided to penetrate through said separator, for allowing a reaction gas containing a fuel gas or an oxygen-containing gas to flow therethrough;

15 gas flow passages which communicate with said communication hole and which are provided in electrode power-generating surfaces of said separators while meandering in said horizontal direction, for supplying said reaction gas to said anode electrode or said cathode electrode; and

20 a porous water-absorbing tube which is arranged in said communication hole, for discharging water.

25 2. The fuel cell stack according to claim 1, wherein: said gas flow passages are provided in a direction of gravity while meandering in said horizontal direction; and an outlet of said porous water-absorbing tube is set at a position higher than said communication hole for said

reaction gas.

3. The fuel cell stack according to claim 1, wherein  
said porous water-absorbing tube is installed at a position  
5 separated from said gas flow passages downwardly in said  
direction of gravity in said communication hole.

4. The fuel cell stack according to claim 1, wherein:  
said porous water-absorbing tube includes a plurality  
10 of wire members wound around an outer circumference of a  
core member; and  
a space is formed by bundling said wire members.

5. The fuel cell stack according to claim 1, wherein  
said porous water-absorbing tube includes:  
a pipe member having a plurality of holes formed at its  
15 outer circumference; and  
a plurality of wire members accommodated in said pipe  
member.

20 6. The fuel cell stack according to claim 1, wherein  
said porous water-absorbing tube includes a water-absorbing  
member which is arranged on a lower side in a direction of  
gravity of said communication hole.

25 7. The fuel cell stack according to claim 1, wherein  
at least one of said outlet side communication holes for

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said reaction gas is provided with a discharge hole for  
supplying said reaction gas at a deep portion as viewed from  
a discharge port.

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8. The fuel cell stack according to claim 7, wherein  
said inlet side communication hole and said outlet side  
communication hole are connected with a bypass flow passage  
at a deep portion as viewed from a supply port of said inlet  
side communication hole and at a deep portion as viewed from  
said discharge port of said outlet side communication hole,  
and an outlet of said bypass flow passage is constructed as  
said discharge hole which is open at said deep portion of  
said outlet side communication hole.

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9. A fuel cell stack comprising a fuel cell unit  
composed of a solid polymer ion exchange membrane interposed  
between an anode electrode and a cathode electrode, and  
separators for supporting said fuel cell unit interposed  
therebetween, said fuel cell units and said separators being  
20 stacked in a horizontal direction, said fuel cell stack  
including:

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an inlet side communication hole which is provided to  
penetrate through said separators, for supplying a reaction  
gas containing a fuel gas or an oxygen-containing gas;  
an outlet side communication hole for discharging a  
reacted gas corresponding to said reaction gas; and  
a discharge hole which is provided at a deep portion as

viewed from a discharge port, for at least one of said outlet side communication holes, for supplying said reaction gas.

5 10. The fuel cell stack according to claim 9, wherein  
a supply port of said inlet side communication hole and said  
discharge port of said outlet side communication hole are  
provided on an identical side.

11. The fuel cell stack according to claim 9, wherein  
said inlet side communication hole and said outlet side  
communication hole are connected with a bypass flow passage  
at a deep portion as viewed from a supply port of said inlet  
side communication hole and at a deep portion as viewed from  
said discharge port of said outlet side communication hole,  
and an outlet of said bypass flow passage is constructed as  
said discharge hole which is open at said deep portion of  
said outlet side communication hole.

20 12. The fuel cell stack according to claim 11, wherein  
a number of flow passages communicating with said inlet side  
communication hole, of said bypass flow passage is set to be  
larger than a number of flow passages communicating with  
said outlet side communication hole.

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13. The fuel cell stack according to claim 11, wherein  
a position of an inlet hole of said bypass flow passage is

set to be lower than a bottom of said inlet side communication hole.

5        14. The fuel cell stack according to claim 9, wherein a position of said discharge hole is set at a position lower than a lowermost position of reaction gas flow passages provided in electrode power-generating surfaces of said separators.

10        15. A fuel cell stack comprising a plurality of fuel cell units each composed of a solid polymer ion exchange membrane interposed between an anode electrode and a cathode electrode, said plurality of fuel cell units being stacked in a horizontal direction with separators intervening therebetween, said fuel cell stack including:

15        an inlet side communication hole which is provided to penetrate through said separators, for supplying a reaction gas containing a fuel gas or an oxygen-containing gas;

20        an outlet side communication hole for discharging a reacted gas corresponding to said reaction gas; and

25        a suction member which is provided at the inside of said inlet side communication hole or said outlet side communication hole and which has an opening for sucking retained water.

16. The fuel cell stack according to claim 15, wherein said inlet side communication hole or said outlet side

communication hole, which is provided with said suction member, is set at lower positions in a direction of gravity in planes of said separators.

5           17. The fuel cell stack according to claim 15, wherein an outlet side flow passage of said suction member is connected to a downstream side of a back pressure valve provided in a flow passage for said gas discharged from said outlet side communication hole.

10           18. The fuel cell stack according to claim 17, wherein an ejector section is formed with a throttle section in said outlet side flow passage of said suction member.

15           19. The fuel cell stack according to claim 15, wherein said suction member is a drainage pipe, and a suction hole, which serves as said opening, is open downwardly at a lower wall at an end portion of said drainage pipe.